

REMARKS/ARGUMENTS

Claims 2-9, 12-17 and 19 remain pending herein.

The present claims are directed to a lithium secondary battery comprising a case (claim 2) or a body member (claim 19), an internal electrode body, an electrolyte, first and second terminals, and at least one insulator positioned between either the case and at least one of the terminals (claim 2) or between the body member and an end cap. The insulator comprises ethylene-propylene rubber (EPR), has a surface hardness of from 30 (durometer A) to 60 (durometer D) and has a volume resistivity of at least 10^{10} ohm-cm.

Claims 2-5, 12, 13 and 19 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,462,820 (Tanaka '820) in view of Japanese 60-35452 (JP '452) and U.S. Patent No. 5,171,647 (Dean '647), further in view of U.S. Patent No. 5,624,771 (Sano '771) and U.S. Patent No. 5,900,331 (Krieger '331).

Tanaka '820 discloses a battery including a gasket 1, a battery can 2 serving as a negative electrode terminal, a negative electrode 3, a separator 4, a positive electrode 5, an electrolyte 6 and a sealing terminal cap 8 serving as a positive electrode terminal (Tanaka '820, column 2, lines 29-37). An arrangement of these components is depicted in Fig. 1 of Tanaka '820. Tanaka '820 discloses a gasket comprising a block copolymer of propylene and ethylene (Tanaka '820, Abstract).

The Office Action contains an acknowledgment that Tanaka '820 does not disclose EPR having a surface hardness within the range recited in claims 2 and 19. The Office Action also contains an acknowledgment that Tanaka '820 does not disclose EPR having a volume resistivity of at least 10^{10} ohm-cm.

Regarding surface hardness, the Office Action contains an assertion that JP '452 discloses a nonaqueous electrolyte battery comprising a polypropylene sealing material

having a Rockwell hardness of at least 95. The PTO interprets JP '452 as disclosing that the sealing material has a "high" hardness, and then refers to Dean '647 for alleged disclosure of what "high" hardness means. That is, the PTO asserts that Dean '647 discloses a vent septum having a "high" durometer hardness material (Dean '647, Abstract), and also discloses that the vent septum should have a "durometer hardness of about 70 Å to 90 Å" (Dean '647, column 6, lines 13-14).

It is respectfully noted that the hardness of a vent septum in Dean '647 bears no relation to the hardness of a packing 26 disclosed in JP '452 or the hardness of a gasket disclosed in Tanaka '820. Furthermore, one of skill in the art considering the selection of an EPR material in Tanaka '820 would not look to disclosure of preferred hardness for a vent septum in the device disclosed in Dean '647 in order to determine the meaning of a Rockwell hardness which exceeds 95. In addition, disclosure of the hardness of a polypropylene material in JP '452 would not guide one of skill in the art in the selection of an EPR material for use in Tanaka '820.

Furthermore, through experimental data generated to correlate the respective different hardness systems, it has been found that Rockwell 95 corresponds to Durometer 70 or more. In addition, JP 2000-149886, whose contents are incorporated into the parent application (USSN 09/114,323), in turn incorporated by reference into the present application, discloses a Comparative Example composed of polypropylene whose Rockwell hardness of 90 is *higher than* Durometer 60 in hardness. Accordingly, Rockwell 95 is outside the scope of the range of hardness recited in claims 2 and 19.

Regarding volume resistivity, the Office Action contains an assertion that Sano '771 discloses a nonaqueous electrolyte cell, and contains reference to Sano '771, column 2, lines 8-13, which state that the cell can be sealed by applying a sealant such as a plastic gasket

having electrical insulation characteristics. The PTO does not address the fact that Sano '771 does not disclose or suggest EPR as its sealant and that Sano '771 does not disclose or suggest any particular specific value for volume resistivity, let alone a volume resistivity of at least 10^{10} ohm-cm. The Office Action contains a statement that Krieger '331 discloses a thermal battery having an insulating layer which has a volume resistivity in the range of 10^{14} to 10^{17} ohm-cm. The PTO, however, does not address the fact that Krieger '331 discloses epoxy material (not EPR) for its insulating layer.

Neither Sano '771 nor Krieger '331 disclose or suggest EPR, and accordingly, neither Sano '771 nor Krieger '331 contains disclosure which would guide one of skill in the art in the selection of an EPR material for use in Tanaka '820. In addition, the insulating layer disclosed in Krieger '331 has a completely different function from the gasket disclosed in Sano '771 or the gasket disclosed in Tanaka '820, and therefore it would not have been obvious to look to Krieger '331 for information regarding the properties which should be exhibited by the gasket of Sano '771 or the gasket of Tanaka '820.

In view of the above, it would not have been obvious to modify the battery disclosed in Tanaka '820 so as to have a gasket made of EPR having a surface hardness within the claimed range or having a volume resistivity of at least 10^{10} ohm-cm. Accordingly, it is respectfully requested that the U.S. PTO reconsider and withdraw this rejection.

Claims 2-9 were rejected under 35 U.S.C. §103(a) over European 771 040 (Kita '040) in view of Tanaka '820, JP '452, Dean '647, Sano '771 and Krieger '331.

EP '040 discloses a battery which includes a casing 17, an electrode assembly, first and second terminals and rings 50 made of polymeric material such as polypropylene. The Office Action contains acknowledgment that Kita '040 does not disclose that the rings 50 comprise ethylene-propylene rubber, that Kita '040 does not disclose that the rings 50 have a

surface hardness within the range recited in the claims, and that Kita '040 does not disclose that the rings 50 have volume resistivity of at least 10^{10} ohm-cm. As discussed above, and as acknowledged in the Office Action, Tanaka '820 does not disclose EPR having a surface hardness within the range recited in claims 2 and 19, and does not disclose EPR having a volume resistivity of at least 10^{10} ohm-cm. In addition, as discussed above, JP '452, Dean '647, Sano '771 and Krieger '331, taken individually or in any combination, do not contain disclosure which would motivate one of skill in the art to modify the gasket disclosed in Tanaka '820 or the rings 50 in Kita '040 so as to have a surface hardness within the range recited in the claims or so as to have a volume resistivity of at least 10^{10} ohm-cm. Accordingly, it is respectfully requested that the U.S. PTO reconsider and withdraw this rejection.

Claims 2-8, 12-17 and 19 were rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,571,632 (Teramoto '632) in view of Tanaka '820, JP '452, Dean '647, Sano '771 and Krieger '331.

Teramoto '632 discloses a battery comprising an outer tube 12a, an inner tube 11a, a spiral electrode laminate structure 13a, sealing plates 15a and insulating gaskets 14 made of polypropylene.

Teramoto '632, like Kita '040, does not disclose that the insulating gaskets 14 comprise ethylene-propylene rubber, does not disclose that the insulating gaskets 14 have a surface hardness within the range recited in the claims, and does not disclose that the insulating gaskets 14 have volume resistivity of at least 10^{10} ohm-cm. As discussed above, and as acknowledged in the Office Action, Tanaka '820 does not disclose EPR having a surface hardness within the range recited in claims 2 and 19, and does not disclose EPR having a volume resistivity of at least 10^{10} ohm-cm. In addition, as discussed above, JP '452,

Dean '647, Sano '771 and Krieger '331, taken individually or in any combination, do not contain disclosure which would motivate one of skill in the art to modify the gasket disclosed in Tanaka '820 or the rings 50 in Kita '040 so as to have a surface hardness within the range recited in the claims or so as to have a volume resistivity of at least 10^{10} ohm-cm. Accordingly, it is respectfully requested that the U.S. PTO reconsider and withdraw this rejection.

Claims 2-5, 12, 13 and 19 were rejected under obviousness-type double patenting over claims 1-12 of U.S. Patent No. 6,139,986 (Kurokawa '986) in view of JP '452, Dean '647, Sano '771 and Krieger '331. The Office Action contains an acknowledgment that the claims of Kurokawa '986 do not recite that the heat shrinkage tube is made of ethylene-propylene rubber having a surface hardness within the range recited in the claims or having volume resistivity of at least 10^{10} ohm-cm.

As discussed above, JP '452, Dean '647, Sano '771 and Krieger '331, taken individually or in any combination, do not contain disclosure which would motivate one of skill in the art to modify the heat shrinkage tube recited in Kurokawa '986 so as to have a surface hardness within the range recited in the claims or so as to have a volume resistivity of at least 10^{10} ohm-cm. Accordingly, it is respectfully requested that the U.S. PTO reconsider and withdraw this rejection.

Claims 2-9, 12-17 and 19 were provisionally rejected under obviousness-type double patenting over claims 1-53 of copending U.S. Patent Application Serial No. 09/863,108 (Enomoto '108) in view of JP '452 and Dean '647. The Office Action contains an acknowledgment that the claims in Enomoto '108 do not disclose that the EPR of the elastic body has a surface hardness within the range recited in the present claims. As discussed above, JP '452 and Dean '647, taken individually or in combination, do not contain

disclosure which would motivate one of skill in the art to modify the elastic body recited in Kurokawa '986 so as to have a surface hardness within the range recited in the claims. Accordingly, it is respectfully requested that the U.S. PTO reconsider and withdraw this rejection.

Claims 2-5, 12-17 and 19 were provisionally rejected under obviousness-type double patenting over claims 1-27 of copending U.S. Patent Application Serial No. 09/937,943 (Enomoto '943) in view of JP '452, Dean '647, Sano '771 and Krieger '331.

The Office Action contains an acknowledgment that the claims of Enomoto '943 do not recite that the elastic body is made of ethylene-propylene rubber having a surface hardness within the range recited in the claims or having volume resistivity of at least 10^{10} ohm-cm.

As discussed above, JP '452, Dean '647, Sano '771 and Krieger '331, taken individually or in any combination, do not contain disclosure which would motivate one of skill in the art to modify the heat shrinkage tube recited in Enomoto '943 so as to have a surface hardness within the range recited in the claims or so as to have a volume resistivity of at least 10^{10} ohm-cm. Accordingly, it is respectfully requested that the U.S. PTO reconsider and withdraw this rejection.

In view of the above, claims 2-9, 12-17 and 19 are in condition for allowance.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

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Date



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Amendments to the Drawings:

The attached sheet of drawings includes changes to Fig. 3. This sheet replaces the original sheet including Fig. 3. In Fig. 3, previously omitted reference number 74 has been added.